**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

**Refer to:**
**2004/00315**

July 29, 2004

Mr. Robert E. Willis
Portland District, Corps of Engineers
CENWP-PM-E (Mr. Kim Larson)
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Conference and Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation for the Columbia River North and South Jetties Rehabilitation, Columbia River Basin, Clatsop County, Oregon (Corps No.: 1165-2-26a)

Dear Mr. Willis:

Enclosed is a biological and conference opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed Columbia River north and south jetties rehabilitation in Clatsop County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of thirteen species of ESA-listed salmonid fishes, Snake River (SR) fall-run Chinook salmon, SR spring/summer-run Chinook salmon, SR sockeye salmon, SR steelhead, Lower Columbia River (LCR) Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, Columbia River chum salmon, Middle Columbia River steelhead, LCR steelhead, UWR steelhead, UCR steelhead, and LCR coho salmon (proposed for listing), or destroy or adversely modify designated critical habitat. As required by section 7 of the ESA, NOAA Fisheries included reasonable and prudent measures with non-discretionary terms and conditions that are necessary to minimize the effects of incidental take associated with this action.

This document also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations (50 CFR Part 600). NOAA Fisheries concluded that the proposed action may adversely affect designated EFH for Pacific salmon, groundfish and coastal pelagic species. As required by section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days after receiving an EFH conservation recommendation.

Please direct any questions regarding this consultation to Robert Anderson of my staff in the Oregon Coast/Lower Columbia River Habitat Branch of the Oregon State Habitat Office at 503.231.2226.

Sincerely,

Russell M Strach for

D. Robert Lohn
Regional Administrator

# Endangered Species Act - Section 7 Consultation
# Biological Opinion and Conference Opinion

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# Magnuson-Stevens Fishery Conservation and Management Act
# Essential Fish Habitat Consultation

Columbia River North and South Jetties Rehabilitation
Columbia River Basin, Clatsop County, Oregon
(Corps No. 165-2-26a)

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: NOAA's National Marine Fisheries Service, Northwest Region

Date Issued: July 29, 2004

Russell M Strach for

Issued by: ________________
D. Robert Lohn
Regional Administrator

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# 1. INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with U.S. Fish and Wildlife Service and NOAA's National Marine Fisheries Service (NOAA Fisheries), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitats. This biological opinion and conference opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations found at 50 CFR 402.

The analysis also fulfills the essential fish habitat (EFH) requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

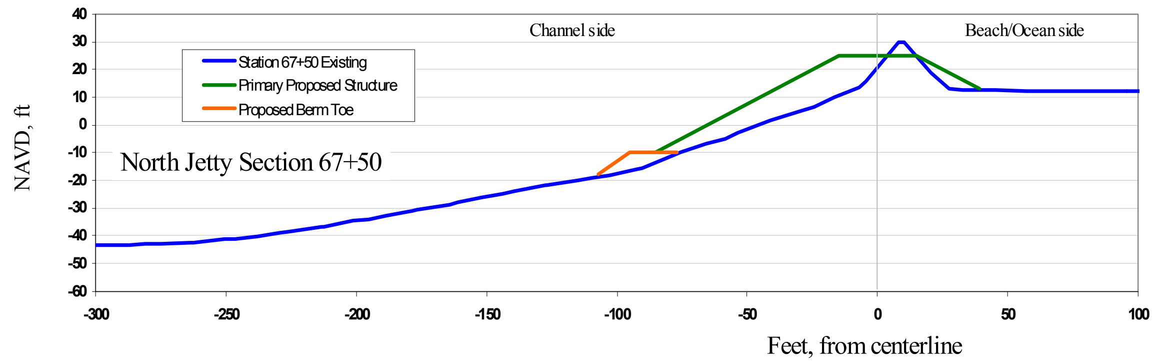
## 1.1 Background and Consultation History

On January 26, 2004, NOAA Fisheries received a letter from the U.S. Army Corps of Engineers (Corps) requesting formal consultation pursuant to section 7(a)(2) of the ESA, and EFH consultation pursuant to section 305(b)(2) of the MSA for the Columbia River north and south jetties rehabilitation, Clatsop County, Oregon. A biological assessment (BA) describing the proposed action and its potential effects was submitted with the letter. On June 15, 2004, the Corps submitted an addendum to the BA modifying the January 26, 2004, proposal. In the BA, the Corps determined the proposed action was likely to adversely affect the following ESA-listed species: Snake River (SR) steelhead (*Oncorhynchus mykiss*), Upper Columbia River (UCR) steelhead, Middle Columbia River (MCR) steelhead, Upper Willamette River (UWR) steelhead, Lower Columbia River (LCR) steelhead, SR spring/summer-run Chinook salmon (*O. tshawytscha*), SR fall-run Chinook salmon, UCR spring-run Chinook salmon, UWR Chinook salmon, LCR Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), SR sockeye salmon (*O. nerka*), and LCR coho salmon (*O. Kisutch*)(proposed for listing). The Corps also found the proposed project may adversely affect designated EFH.

## 1.2 Proposed Action

The proposed action is the authorization and funding by the Corps for the rehabilitation of the Columbia River north and south jetties. The proposed rehabilitation would occur along a 4,000 foot-long reach of the north jetty (stations 40+00 to 80+00), and an 8,000 foot-long reach of the south jetty (stations 220+00 to 300+00). The Corps proposes to place up to 300,000 tons of rock along the north jetty and up to 500,000 tons of rock along the south jetty, within the original design footprint of the jetties. Rock classes for the proposed rehabilitation would range from 10 to 25 tons for the north jetty and 10 to 40 tons for the south jetty. Crest elevations for both the north and the south jetties would be set at +25 feet (ft) mean lower low water (MLLW), and crest widths would be set at +30 ft MLLW. Slope angles for the north jetty would be set at 1Vertical (V): 2 Horizontal (H) on the ocean side (–10 ft MLLW to +25 ft MLLW), and at 1H:1.5V on the channel side (–10 ft MLLW to –20 ft MLLW) (Figure 1). Slope angles for the south jetty would be set at 1H:3V on the ocean side (–20 ft MLLW to +25 ft MLLW) and 1H:2V on the channel side (+5 ft MLLW to +25 ft MLLW) (Figure 2).

**Figure 1.** Columbia River north jetty cross sections looking toward the Pacific Ocean.



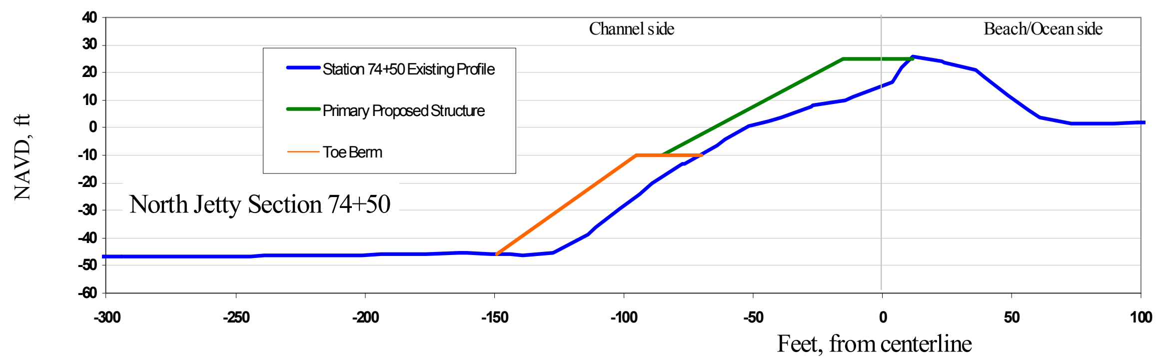
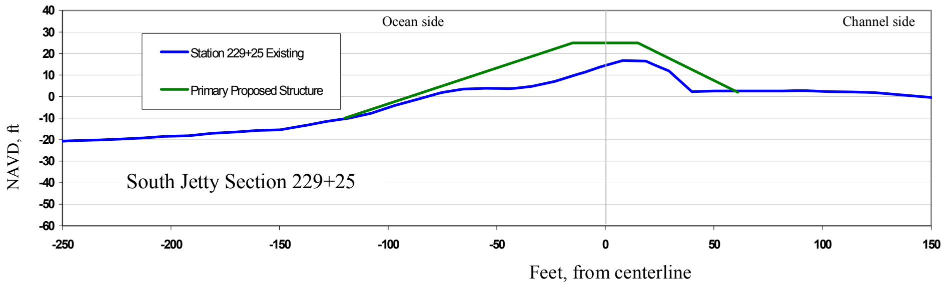
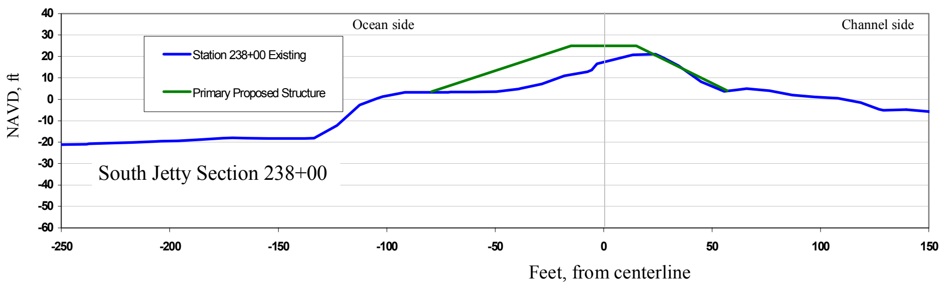



**Figure 2.** Columbia River south jetty cross sections looking toward the Pacific Ocean.




The proposed jetty repairs would include marine-based and land-based operations. For marine-based operations, materials would be brought to the project site by two means. The first marine-based feature would be a towboat and barge operation, where water depth, wave, and current conditions permit. During offloading, the barge would be secured to 4 to 8 dolphin piles within 200 ft of the jetty. Dolphin piles, and barge locations, would be relocated throughout the project area and removed once repairs to the jetties are completed. The dolphin piles would be installed using a vibratory hammer, if substrate conditions are appropriate, and consist of 3 piles per dolphin, either untreated timber or steel, and driven to depth of 15 to 25 ft below grade. The maximum number of dolphin piles present along the south and north jetty during any one time would be 20 to 25. Rock would be off-loaded from a barge by a crane, and either set in place on the jetty or stockpiled on the jetty crest. For marine-based operations, a crane or large tracked-excavator would be fixed to a moored barge. The crane-barge would be moored using either a series of anchors or the barge would be tied to 4 to 8 dolphin piles parallel to the jetty. The crane would then advance along the jetty until repairs are completed.

The second marine-based feature would be construction of two, 200-foot long temporary (2 to 4 years) fixed barge offloading platforms, one for each jetty, constructed along the banks of the Columbia River. Each platform would be constructed of steel sheet piling, and would require excavation of approximately 7,500 cubic yards (cy) of material from within the platform areas. Once the platforms are constructed, approximately 45,000 cy of rock will be placed within the platform perimeters to form a solid feature for offloading operations. The steel sheet pilings would be installed and removed using a vibratory hammer.

For land-based operations, a crane or large tracked-excavator would be stationed on top of the jetties. Land-based operations would require the construction of six haul roads. Jetty haul roads would be located above mean higher high water (MHHW) and would be constructed in a manner to minimize effects to wetlands.

For the north jetty, marine and/or land-based operations would be used for repair activities. Two temporary staging areas, each approximately 5 acres in size, would be constructed near the Benson Beach parking lot at Fort Canby State Park for vehicle, equipment, and material storage. In addition to the two constructed staging areas, the parking lot would be used as a staging area. Four haul roads, three of them temporary, would be constructed for land-based operations requiring approximately 20,000 tons of gravel and rip rap. The first haul road would be constructed from the fixed barge offloading platform (station 40+15) and would connect to the three staging areas. The second and third haul roads would be constructed near station 65+00 and station 70+00, respectively, and connect to the staging area nearest the beach (see consultation proposal for details). The fourth haul road would be constructed along the crest of the north jetty from station 40+00 to station 80+00. The staging areas and haul roads, except for the haul road along the crest of the north jetty, would be removed and restored to pre-construction conditions once repairs to the jetty are completed.

For the south jetty, marine-based and/or land-based operations would be used for rehabilitation activities. Two temporary staging areas, each approximately 5 acres in size, would be constructed for vehicle, equipment, and material storage. The first staging area would be constructed near the fixed barge offloading platform. The second staging area would be constructed beside the south jetty (station 168+00 to station 176+00). Three haul roads, two temporary, would be constructed for land-based operations requiring approximately 75,000 tons of gravel and rip rap. The first haul road would be constructed from the staging area beside the barge offloading platform on the north shore of Clatsop Spit and would extend through a mix of intertidal marshlands and uplands to the staging area beside the jetty (station 170+00). The second haul road would entail the reconstruction of an existing haul road that ties into the south jetty. The third haul road would be constructed along the crest of the south jetty. In addition to use of the constructed haul roads, existing gravel and paved roads would be used.

To connect the staging area to the jetty haul road, a temporary gravel access road would be constructed from the staging area nearest the jetty to the jetty crest. The access road would measure approximately 400 ft in length by 25 ft in width, would be above MHHW, would require approximately 4,000 cy of sand, gravel and rip rap, and would require the installation and removal of a temporary culvert near station 178+00 to maintain tidal exchange into and out of the intertidal wetland. The staging areas and haul roads, except for the jetty haul road, would be removed and restored to pre-construction conditions once repairs to the jetty are completed.

Rehabilitation activities likely would occur concurrently on both jetties, and may occur year-round. The Corps estimates the duration of repair activities to be 2 to 4 years.

### 1.3 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). For this consultation, NOAA Fisheries defines the action area as all aquatic and upland habitats, including the adjacent riparian zone: (1) Within 700 ft (measured from the jetty crest) from the north jetty from station 25+00 to station 105+00; and (2) within 700 ft (measured from the jetty crest) from the south jetty from station 55+00 to station 325+00, including the staging area and haul road near the north shore of Clatsop Spit; and (3) an area extending 700 ft from the fixed barge offloading platform beside the north shore of Clatsop Spit.

## 2. ENDANGERED SPECIES ACT

### 2.1 Biological Opinion

This consultation considers the potential effects of the proposed action by the Corps on SR steelhead, UCR steelhead, MCR steelhead, UWR steelhead, LCR steelhead, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, UCR spring-run Chinook salmon, UWR Chinook salmon, LCR Chinook salmon, CR chum salmon, SR sockeye salmon, and LCR coho salmon. Species' listing dates, critical habitat designations, and take prohibitions are listed in Table 1. The objective of this consultation is to determine whether the proposed action is likely to jeopardize the continued existence of the ESA-listed species, or destroy or adversely modify designated critical habitat for SR fall Chinook, SR spring/summer Chinook salmon, or SR sockeye salmon. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations (50 CFR 402).

**Table 1.** Endangered and Threatened Pacific Salmon and Steelhead Under NOAA Fisheries' Jurisdiction in Oregon

| Species ESU | Listing Status | Critical Habitat | Protective Regulations |
|---|---|---|---|
| **Chinook salmon (*Oncorhynchus tshawytscha*)** | | | |
| Lower Columbia River | T 3/24/99; 64 FR 14308 | Not applicable | 7/10/00; 65 FR 42422 |
| Upper Willamette River | T 3/24/99; 64 FR 14308 | Not applicable | 7/10/00; 65 FR 42422 |
| Upper Columbia River spring-run | E 3/27/99; 64 FR 14308 | Not applicable | ESA section 9 applies |
| Snake River spring / summer run | T 4/22/92; 57 FR 14653 | 10/25/99; 64 FR 57399 | 7/10/00; 65 FR 42422 |
| Snake River fall-run | T 6/3/92; 57 FR 23458 | 12/28/93; 58 FR 68543 | 7/10/00; 65 FR 42422 |
| **Chum salmon (*O. keta*)** | | | |
| Columbia River | T 3/25/99; 64 FR 14508 | Not applicable | 7/10/00; 65 FR 42422 |
| **Coho salmon (*O. kisutch*)** | | | |
| Lower Columbia River | P 6/14/04; 69 FR 33102 | Not applicable | Not applicable |
| **Sockeye salmon (*O. nerka*)** | | | |
| Snake River | E 11/20/91; 56 FR 58619 | 12/28/93; 58 FR 68543 | ESA section 9 applies |
| **Steelhead (*O. mykiss*)** | | | |
| Lower Columbia River | T 3/19/98; 63 FR 13347 | Not applicable | 7/10/00; 65 FR 42422 |
| Upper Willamette River | T 3/25/99; 64 FR 14517 | Not applicable | 7/10/00; 65 FR 42422 |
| Middle Columbia River | T 3/25/99; 64 FR 14517 | Not applicable | 7/10/00; 65 FR 42422 |
| Upper Columbia River | E 8/18/97; 62 FR 43937 | Not applicable | ESA section 9 applies |
| Snake River Basin | T 8/18/97; 62 FR 43937 | Not applicable | 7/10/00; 65 FR 42422 |

### 2.1.1 Biological Information and Critical Habitat

<u>SR Fall Chinook Salmon</u>
The SR fall Chinook salmon evolutionarily significant unit (ESU) once spawned in the mainstem of the Snake River, from its confluence with the Columbia River, upstream to Shoshone Falls (RM 615). The spawning grounds between Huntington (RM 328) and Auger Falls (RM 607) were historically the most important for this species. Only limited spawning activity occurred downstream from RM 273 (Waples *et al.* 1991a), about one mile below Oxbow Dam (Waples *et*

*al.* 1991a). However, irrigation and hydropower projects on the mainstem Snake River have inundated, or blocked access to, most of this area in the past century. The construction of Swan Falls Dam (RM 458) in 1901, eliminated access to much of this habitat and the completion of Brownlee Dam in 1958 (RM 285), Oxbow Dam in 1961 (RM 272), and Hells Canyon Dam in 1967 (RM 247) blocked access to the rest.

Since 1991, spawning has been limited primarily to the mainstem Snake River between a point upstream of Lower Granite Reservoir (RM 149) and Hells Canyon Dam (RM 247, and the lower reaches of the Grande Ronde, Clearwater, and Tucannon Rivers, all tributaries to the Snake River. Redds in the Clearwater River have been observed from its mouth to slightly upstream of its confluence with the north fork (about 40 miles).

No reliable estimates of historical abundance are available (Waples *et al.* 1991b), but because of their dependence on mainstem habitat for spawning, fall Chinook have probably been affected to a greater extent by irrigation and hydroelectric projects than any other species of salmon in the Snake River basin. The mean number of adult SR fall Chinook salmon declined from 72,000 in the 1930s and 1940s, to 29,000 during the 1950s. In spite of this, the Snake River remained the most important natural production area for fall Chinook in the Columbia River basin throughout the 1950s. The number of adults counted at the uppermost Snake River mainstem dams averaged 12,720 total spawners from 1964 to 1968; 3,416 spawners from 1969 to 1974; and 610 spawners from 1975 to 1980 (Waples, *et al.* 1991b). Most adult SR fall Chinook spend 3 years at sea before migrating up the Columbia and Snake Rivers between August and October (Waples *et al.* 1991b). Spawning occurs in the mainstem Snake River and in the lower parts of its major tributaries in between late October and mid-December, typically peaking in November (Myers *et al.* 1998). Fry emerge from the spawning beds from late March through early June. At present, the peak of the smolt outmigration usually occurs in July, however, juvenile fall Chinook may be found migrating in the lower Snake and Columbia Rivers from May through October.[1] SR fall Chinook typically exhibit an "ocean" type juvenile life history pattern, usually rearing in freshwater for only a few months before migrating to the ocean.

[1] In its comments on the draft USBR 1999 Biological Opinion, the State of Idaho commented that "it is generally accepted that peak juvenile SR fall Chinook migration historically coincided with the declining hydrograph following spring snowmelt" (Kempthorne 1999). However, Krzma and Raleigh (1970) observed that the migration of juvenile fall Chinook into Brownlee Reservoir in 1962 and 1963, began in mid-April, and ended by mid-June (roughly 75% of the migration took place during the second and third weeks of May in those years). Juvenile fall Chinook captured between mid-May and mid-June averaged 71, 81, and 79 mm in 1962, 1963, and 1964, respectively. Similarly, Mains and Smith (1964), who monitored the migration of Chinook salmon in the lower Snake River (RM 82) in 1954 and 1955, collected Chinook salmon fry (most likely those of fall Chinook salmon) migrating in March and April, and documented that the migration of Chinook salmon smolts was nearly complete by the end of June. The average length of fingerlings in June was 90.7 mm. Thus, the historic migration of fall Chinook salmon through the Snake River was more likely to have occurred between late-May and late-June, nearer the peak of historical hydrograph.

SR Spring/Summer Chinook Salmon
It is estimated that at least 1.5 million spring/summer Chinook salmon returned to the Snake River in the late 1800s, approximately 39 to 44% of all spring/summer Chinook in the Columbia River basin. Historically, Shoshone Falls (RM 615) was the uppermost limit to spring/summer Chinook migration, and spawning occurred in virtually all suitable and accessible habitat in the Snake River basin (Fulton 1968 and Matthews and Waples 1991). The development of mainstem irrigation and hydroelectric projects in the mainstem Snake River basin have significantly reduced the amount of habitat available for spring/summer Chinook such that between 1950 and 1960, an average of 125,000 adults returned to the Snake River; only 8% of the historic estimate. An estimated average of 100,000 wild adults would have returned from 1964 to 1968, each year after adjusting for fish harvested in the river fisheries below McNary Dam. However, actual counts of wild adults at Ice Harbor Dam annually averaged only 59,000 each year from 1962 to 1970. The estimated number of wild adult Chinook salmon passing Lower Granite Dam between 1980 and 1990, was 9,674 fish (Matthews and Waples 1991). A recent 5-year geometric mean (1992 to 1996) was only 3,820 naturally-produced spawners (Myers *et al.* 1998). This is less than 0.3% of the estimated historical abundance of wild SR spring/summer Chinook.

SR spring/summer Chinook migrate through the Columbia River from March through July, and spawn in smaller, higher elevation streams than do fall Chinook. Fry generally emerge from the gravel between February and June. SR spring/summer Chinook exhibit a “stream” type juvenile life history pattern, rearing for one, or sometimes even two years in freshwater before migrating to the ocean from April through June. These smolts are often referred to “yearling” Chinook. Adults typically remain in the ocean for two or three years before returning to spawn (Matthews and Waples 1991).

SR Sockeye Salmon
Before the turn of the century (c. 1880), about 150,000 sockeye salmon ascended the Wallowa, Payette, and Salmon River basins to spawn in natural lakes (Evermann 1896). Sockeye populations in the Payette basin lakes were eliminated after a diversion dam near Horseshoe Bend was constructed in 1914, and Black Canyon Dam was completed in 1924. In 1916, a dam at Wallowa Lake was increased in height, resulting in the extinction of indigenous sockeye in Wallowa Lake. Sockeye salmon in the Salmon River occurred historically in at least four lakes within Idaho’s Stanley basin: Alturas, Redfish, Pettit, and Stanley Lakes. Sunbeam Dam, 20 miles downstream from Redfish Lake, severely limited sockeye and other anadromous salmonid production in the upper Salmon River between 1910 to 1934 (Waples *et al.* 1991a). In the 1950s and 1960s, more than 4,000 adults returned annually to Redfish Lake. Between 1985 and 1987, an average of 13 sockeye were counted at the Redfish Lake weir. Only 10 sockeye have returned to Redfish Lake since 1994: One in 1994, one in 1996, one in 1998 and seven in 1999 (all of those returning in 1999 were 2nd generation progeny of wild sockeye that returned to Idaho in 1993). Since 1991, adult sockeye returning to Redfish Lake have been captured to support a captive broodstock program.

Historically, SR sockeye salmon adults entered the Columbia River in June and July, migrated upstream through the Snake and Salmon Rivers, and arrived at Redfish Lake in August and September. Spawning peaks in October and occurs in lakeshore gravels. Fry emerge in late April and May and move immediately to the open waters of the lake where they feed on plankton for 1 to 3 years before migrating to the ocean. Juvenile sockeye generally leave Redfish Lake from late April through May, and migrate nearly 900 miles to the Pacific Ocean. Although pre-dam reports indicate that sockeye salmon smolts migrated in May and June, tagged sockeye smolts from Redfish Lake passed Lower Granite Dam from mid-May to mid-July. SR sockeye spend 2 to 3 years in the Pacific Ocean before returning to their natal lake to spawn.

<u>SR Steelhead</u>
Historically, SR steelhead spawned in virtually all accessible habitat in the Snake River up to Shoshone Falls (RM 615). The development of irrigation and hydropower projects on the mainstem Snake River have significantly reduced the amount of available habitat for this species. No valid historical estimates of adult steelhead returning to the Snake River basin before the completion of Ice Harbor Dam in 1962, are available. However, SR steelhead sportfishing catches ranged from 20,000 to 55,000 fish during the 1960s (Fulton 1970). The run of steelhead was likely several times as large as the sportfish take. Between 1949 and 1971, adult steelhead counts at Lewiston Dam (on the Clearwater River) averaged about 40,000 per year. The count at Ice Harbor Dam in 1962 was 108,000, and averaged approximately 70,000 per year between 1963 and 1970.

A recent 5-year geometric mean (1990 to 1994) for escapement above Lower Granite Dam was approximately 71,000. However, the wild component of this run was only 9,400 adults (7,000 A-run and 2,400 B-run). In recent years, average densities of wild juvenile steelhead have decreased significantly for both A-run and B-run steelhead. Many basins within the Snake River are significantly under-seeded relative to the carrying capacity of streams (Busby *et al.* 1996).

Steelhead populations exhibit both anadromous (steelhead) and freshwater resident (rainbow or red-band trout) forms. Unlike other Pacific salmon species, steelhead are capable of spawning on more than one occasion, and returning to the ocean to feed between spawning events. SR steelhead rarely return to spawn a second time. Steelhead can be classified into two reproductive types: Stream-maturing steelhead, which enter fresh water in a sexually immature condition and wait several months before spawning; and ocean-maturing steelhead, which return to freshwater with fully developed gonads and spawn shortly thereafter. In the Pacific Northwest, stream-maturing steelhead enter fresh water between May and October, and are referred to as "summer" steelhead. In comparison, ocean-maturing steelhead return between November and April and are considered "winter" steelhead. Inland steelhead populations in the Columbia River basin are almost exclusively of the summer variety (Busby *et al.* 1996).

SR steelhead can be further divided into two groupings: A-run steelhead and B-run steelhead. This dichotomy reflects the bimodal migration of adult steelhead observed at Bonneville Dam. A-run steelhead generally return to fresh water between June and August after spending 1 year in the ocean. These fish are typically less than 77.5 centimeters (cm) in length. B-run steelhead usually return to fresh water from late August to October after spending 2 years in the ocean and are generally greater than 77.5 cm in length.

Both A-run and B-run spawn the following spring from March to May in small to mid-sized streams. The fry emerge in 7 to 10 weeks, depending on temperature, and usually spend 2 or 3 years in fresh water before migrating to the ocean from April to mid-June. These estimates are based on population averages and steelhead are capable of remarkable plasticity with in their life cycles.

<u>LCR Chinook Salmon</u>
The LCR Chinook salmon ESU includes all native populations from the mouth of the Columbia River to the crest of the Cascade Range, excluding populations above Willamette Falls. The former location of Celilo Falls (inundated by The Dalles reservoir in 1960) is the eastern boundary for this ESU. Stream-type, spring-run Chinook salmon found in the Klickitat River, or the introduced Carson spring-run Chinook salmon strain, are not included in this ESU. Spring-run Chinook salmon in the Sandy River have been influenced by spring-run Chinook salmon introduced from the Willamette River ESU. However, analyses suggest that considerable genetic resources still reside in the existing population (Myers *et al.* 1998). Recent escapements above Marmot Dam on the Sandy River average 2,800 and have been increasing (ODFW 1998).

Historical records of Chinook salmon abundance are sparse, but cannery records suggest a peak run of 4.6 million fish in 1883. Although fall-run Chinook salmon are still present throughout much of their historical range, most of the fish spawning today are first-generation hatchery strays. Furthermore, spring-run populations have been severely depleted throughout the ESU and extirpated from several rivers.

Apart from the relatively large and apparently healthy fall-run population in the Lewis River, production in this ESU appears to be predominantly hatchery-driven, with few identifiable naturally-spawned populations. All basins are affected (to varying degrees) by habitat degradation. Hatchery programs have had a negative effect on the native ESU. Efforts to enhance Chinook salmon fisheries abundance in the lower Columbia River began in the 1870s. Available evidence indicates a pervasive influence of hatchery fish on natural populations throughout this ESU, including both spring- and fall-run populations. The large number of hatchery fish in this ESU make it difficult to determine the proportion of naturally-produced fish. The loss of fitness and diversity within the ESU is an important concern. The median population growth rate over a base period from 1980 through 1998, ranged from 0.98 to 0.88, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure *et al.* 2000).

<u>UCR Spring Chinook Salmon</u>
The UCR ESU includes spring-run Chinook populations found in Columbia River tributaries between Rock Island and Chief Joseph Dams, notably the Wenatchee, Entiat, and Methow River basins. The populations are genetically and ecologically separate from the summer- and fall-run populations in the lower parts of many of the same river systems (Myers *et al.* 1998). Although

fish in this ESU are genetically similar to spring Chinook in adjacent ESUs, they are distinguished by ecological differences in spawning and rearing habitat preferences. For example, spring-run Chinook in upper Columbia River tributaries spawn at lower elevations (500 to 1,000 m) than in the Snake and John Day River systems.

The UCR populations were intermixed during the Grand Coulee Fish Maintenance Project (1939 through 1943), resulting in loss of genetic diversity between populations in the ESU. Homogenization remains an important feature of the ESU. Fish abundance has tended downward both recently and over the long term. At least six former populations from this ESU are now extinct, and nearly all extant populations have fewer than 100 wild spawners.

Given the lack of information on Chinook salmon stocks that are presumed to be extinct, the relationship of these stocks to existing ESUs is uncertain. Recent total abundance within this ESU is quite low, and escapements in 1994 to 1996 were the lowest in at least 60 years. At least 6 populations of spring Chinook salmon in this ESU have become extinct, and almost all remaining naturally-spawning populations have fewer than 100 spawners. Extinction risks for UCR spring Chinook salmon are 50% for the Methow, 98% for the Wenatchee, and 99% for the Entiat spawning populations (Cooney 2002). In 2002, the spring Chinook count at Priest Rapids Dam was 34,083, with 24,000 arriving at Rock Island Dam. The 2002 count was about 67.6% and 242% of the respective 2001, and 10-year average adult spring Chinook count at Priest Rapids Dam.

UWR Chinook Salmon

The UWR Chinook salmon ESU includes native spring-run populations above Willamette Falls and in the Clackamas River. In the past, it included sizable numbers of spawning salmon in the Santiam River, the middle fork of the Willamette River, and the McKenzie River, as well as smaller numbers in the Molalla River, Calapooia River, and Albiqua Creek. Although the total number of fish returning to the Willamette has been relatively high (24,000), about 4,000 fish now spawn naturally in the ESU, two-thirds of which originate in hatcheries. The McKenzie River supports the only remaining naturally-reproducing population in the ESU (ODFW 1998).

There are no direct estimates of the size of the Chinook salmon runs in the Willamette basin before the 1940s. The Native American fishery at the Willamette Falls may have yielded 908,000 kilograms (kg) of salmon (454,000 fish, each weighing 9.08 kg) (McKernan and Mattson 1950). Egg collections at salmon hatcheries indicate that the spring Chinook salmon run in the 1920s may have been five times the run size of 55,000 fish in 1947, or 275,000 fish (Mattson 1948). Much of the early information on salmon runs in the upper Willamette River basin comes from operation reports of state and Federal hatcheries.

Fish in this ESU are distinct from those of adjacent ESUs in life history and marine distribution. The life history of Chinook salmon in the UWR ESU includes traits from both ocean- and stream-type development strategies. Tag recoveries indicate that the fish travel to the marine waters off British Columbia and Alaska. More Willamette fish are recovered in Alaskan waters than fish from the LCR ESU. UWR Chinook salmon mature in their fourth or fifth years.

Historically, 5-year-old fish dominated the spawning migration runs, however, recently most fish have matured at age 4. The timing of the spawning migration is limited by Willamette Falls. High flows in the spring allow access to the upper Willamette basin, whereas low flows in the summer and autumn prevent later-migrating fish from ascending the falls. The low flows may serve as an isolating mechanism, separating this ESU from others nearby.

While the abundance of UWR spring Chinook salmon has been relatively stable over the long term and there is evidence of some natural production, at present natural production and harvest levels the natural population is not replacing itself. With natural production accounting for only one-third of the natural spawning escapement, natural spawners may not be capable of replacing themselves even in the absence of fisheries. The introduction of fall-run Chinook into the basin and the laddering of Willamette Falls have increased the potential for genetic introgression between wild spring- and hatchery fall-run Chinook. Habitat blockage and degradation are significant problems in this ESU.

The median population growth rate over a base period from 1980 through 1998, ranges from 1.01 to 0.63, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure *et al.* 2000).

<u>CR Chum Salmon</u>
Chum salmon of the CR ESU spawn in tributaries and in mainstem areas below Bonneville Dam. Most fish spawn on the Washington side of the Columbia River (Johnson *et al.* 1997). Previously, chum salmon were reported in almost every river in the lower Columbia River basin, but most runs disappeared by the 1950s (Rich 1942, Marr 1943, Fulton 1970). The Washington Department of Fish and Wildlife (WDFW) regularly monitors only a few natural populations in the basin, one in Grays River, two in small streams near Bonneville Dam, and the mainstem area next to one of the latter two streams. Recently, spawning has occurred in the mainstem Columbia River at two spots near Vancouver, Washington, and in Duncan Creek below the Bonneville Dam.

Historically, the CR chum salmon ESU supported a large commercial fishery in the first half of this century, landing more than 500,000 fish per year as recently as 1942. Commercial catches declined beginning in the mid-1950s, and in later years rarely exceeded 2,000 per year. There are now no recreational or directed commercial fisheries for chum salmon in the Columbia River, although chum salmon are taken incidentally in the gill-net fisheries for coho and Chinook salmon, and some tributaries have a minor recreational harvest (WDF *et al.* 1993). Observations of chum salmon still occur in most of the 13 basins/areas that were identified in 1951 as hosting chum salmon, however, fewer than 10 fish are usually observed in these areas. In 1999, the WDFW located another Columbia River mainstem spawning area for chum salmon near the I-205 bridge (WDFW 2000).

Chum salmon enter the Columbia River from mid-October through early December and spawn from early November to late December. Recent genetic analysis of fish from Hardy and Hamilton Creeks and from the Grays River indicate that these fish are genetically distinct from other chum salmon populations in Washington. Genetic variability within and between populations in several geographic areas is similar, and populations in Washington show levels of genetic subdivision typical of those seen between summer- and fall-run populations in other areas, and are typical of populations within run types (Salo 1991, WDF *et al.* 1993, Phelps *et al.* 1994, Johnson *et al.* 1997).

The median population growth rate is 1.04 over a base period from 1980 through 1998, for the ESU as a whole (McClure *et al.* 2000). Because census data are peak counts (and because the precision of those counts decreases markedly during the spawning season as water levels and turbidity rise), NOAA Fisheries is unable to estimate the risk of absolute extinction for this ESU.

<u>MCR Steelhead</u>
The MCR ESU occupies the Columbia River basin from above the Wind River in Washington, and the Hood River in Oregon, and continues upstream to include the Yakima River in Washington. The region includes some of the driest areas of the Pacific Northwest, generally receiving less than 40 cm of precipitation annually (Jackson 1993). Summer steelhead are widespread throughout the ESU, and winter steelhead occur in Mosier, Chenowith, Mill, and Fifteenmile Creeks, Oregon, and in the Klickitat and White Salmon Rivers, Washington. The John Day River probably represents the largest native, naturally-spawning stock of steelhead in the region.

Estimates of historical (pre-1960s) abundance specific to this ESU are available for the Yakima River, which has an estimated run size of 100,000 (WDF *et al.* 1993). Assuming comparable run sizes for other drainage areas in this ESU, the total historical run size may have exceeded 300,000 steelhead (NOAA 2000a).

Most fish in this ESU smolt at 2 years and spend 1 to 2 years in salt water before re-entering freshwater, where they may remain up to a year before spawning (Howell *et al.* 1985). All steelhead upstream of The Dalles Dam are summer-run (Schreck *et al.* 1986, Reisenbichler *et al.* 1992, Chapman *et al.* 1994, Busby *et al.* 1996). The Klickitat River, however, produces both summer and winter steelhead, and age-2-ocean steelhead dominate the summer steelhead, whereas most other rivers in the region produce about equal numbers of both age 1- and 2-ocean fish. A non-anadromous form co-occurs with the anadromous form in this ESU; information suggests that the two forms may not be isolated reproductively, except where barriers are involved.

Current population sizes are substantially lower than historic levels, especially in the rivers with the largest steelhead runs in the ESU, the John Day, Deschutes, and Yakima Rivers. At least two extinctions of native steelhead runs in the ESU have occurred (the Crooked and Metolius Rivers, both in the Deschutes River basin). For the MCR steelhead ESU as a whole, (NOAA 2000a) estimates that the median population growth rate over the base period (1990 to 1998) ranges from 0.88 to 0.75, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure *et al.* 2000). In 2002, the count of Bonneville Dam steelhead totaled 481,036, and exceeded all counts recorded at Bonneville Dam since 1938, except the 2001 total, which was 633,464. Of the total return in 2002, 143,032 were considered wild steelhead (Fish Passage Center 2003).

LCR Steelhead

The LCR ESU encompasses all steelhead runs in tributaries between the Cowlitz and Wind Rivers on the Washington side of the Columbia, and the Willamette and Hood Rivers on the Oregon side. The populations of steelhead that make up the LCR steelhead ESU are distinguished from adjacent populations by genetic and habitat characteristics. The ESU consists of summer and winter coastal steelhead runs in the tributaries of the Columbia River as it cuts through the Cascades. These populations are genetically distinct from inland populations (east of the Cascades), as well as from steelhead populations in the upper Willamette River basin and coastal runs north and south of the Columbia River mouth. Not included in the ESU are runs in the Willamette River above Willamette Falls (UWR ESU), runs in the Little and Big White Salmon Rivers (MCR ESU), and runs based on four imported hatchery stocks: (1) Early-spawning winter Chambers Creek/lower Columbia River mix, (2) summer Skamania Hatchery stock, (3) winter Eagle Creek NFH stock, and (4) winter Clackamas River Oregon Department of Fish and Wildlife (ODFW) stock (63 FR 13351 and 13352). This area has at least 36 distinct runs (Busby *et al.* 1996), 20 of which were identified in the initial listing petition. In addition, numerous small tributaries have historical reports of fish, but no current abundance data. The major runs in the ESU, for which there are estimates of run size, are the Cowlitz River winter runs, Toutle River winter runs, Kalama River winter and summer runs, Lewis River winter and summer runs, Washougal River winter and summer runs, Wind River summer runs, Clackamas River winter and summer runs, Sandy River winter and summer runs, and Hood River winter and summer runs (NOAA 2000a).

All runs in the LCR steelhead ESU have declined from 1980 to 2000, with sharp declines beginning in 1995 (NOAA 2000a). Historic counts in some of the larger tributaries (Cowlitz, Kalama, and Sandy Rivers) probably exceeded 20,000 fish; more recent counts have been in the range of 1,000 to 2,000 fish (NOAA 2000a). Habitat loss, hatchery steelhead introgression, and harvest are the major contributors to the decline of steelhead in this ESU. For the LCR steelhead ESU, NOAA (2000a) estimates that the median population growth rate over the base period (1990 to 1998) ranges from 0.98 to 0.78, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure *et al.* 2000).

UWR Steelhead

The UWR steelhead ESU occupies the Willamette River and tributaries upstream of Willamette Falls, extending to and including the Calapooia River. These major river basins containing spawning and rearing habitat comprise more than 12,000 square kilometers ($km^2$) in Oregon. Rivers that contain naturally-spawning, winter-run steelhead include the Tualatin, Molalla, Santiam, Calapooia, Yamhill, Rickreall, Luckiamute, and Mary's, although the origin and distribution of steelhead in a number of these basins is being debated. Early migrating winter and summer steelhead have been introduced into the upper Willamette basin, but those components are not part of the ESU. Native winter steelhead within this ESU have been declining since 1971, and have exhibited large fluctuations in abundance.

Over the past several decades, total abundance of natural late-migrating winter steelhead ascending the Willamette Falls fish ladder has fluctuated several times over a range of approximately 5,000 to 20,000 spawners. However, the last peak occurred in 1988, and this peak has been followed by a steep and continuing decline. Abundance in each of year from 1993 to 1998, was below 4,300 fish, and the run in 1995, was the lowest in 30 years.

In general, native steelhead of the Upper Willamette River are late-migrating winter steelhead, entering freshwater primarily in March and April. This atypical run timing appears to be an adaptation for ascending Willamette Falls, which functions as an isolating mechanism for UWR steelhead. Reproductive isolation resulting from the falls may explain the genetic distinction between steelhead from the upper Willamette River basin and those in the lower river. UWR late-migrating steelhead are ocean-maturing fish. Most return at age 4, with a small proportion returning as 5-year-olds (Busby *et al.* 1996). Willamette Falls (Rkm 77) is a known migration barrier (NOAA 2000a). Winter steelhead and spring Chinook salmon historically occurred above the falls, whereas summer steelhead, fall Chinook, and coho salmon did not. Detroit and Big Cliff Dams cut off access to 540 km of spawning and rearing habitat in the North Santiam River. In general, habitat in this ESU has become substantially simplified since the 1800s by removal of large woody debris to increase the river's navigability.

Habitat loss, hatchery steelhead introgression, and harvest are the major contributors to the decline of steelhead in this ESU. For the UWR steelhead ESU, the estimated median population growth rate for 1990-1998 ranged from 0.94 to 0.87, decreasing as the effectiveness of hatchery fish spawning in the wild increased compared with that of fish of wild origin (McClure *et al.* 2000).

UCR Steelhead

This inland steelhead ESU occupies the Columbia River basin upstream from the Yakima River to the U.S./Canada border. Rivers in the area primarily drain the east slope of the northern Cascade Mountains and include the Wenatchee, Entiat, Methow, and Okanogan River basins.

Estimates of historical (pre-1960s) abundance specific to this ESU are available from fish counts at dams (NOAA 2000a). Counts at Rock Island Dam from 1933 to 1959, averaged 2,600 to 3,700, suggesting a pre-fishery run size exceeding 5,000 adults for tributaries above Rock Island Dam (Chapman *et al.* 1994, Busby *et al.* 1996). Lower Columbia River harvests had already depressed fish stocks during the period in which these counts were taken, thus, the pre-fishery estimate should be viewed with caution.

Habitat degradation, juvenile and adult mortality in the hydropower system, and unfavorable environmental conditions in both marine and freshwater habitats have contributed to the declines and represent risk factors for the future. Harvest in lower river fisheries and genetic homogenization from composite broodstock collection are other factors that may contribute significant risk to the UCR steelhead ESU.

The median population growth rate over a base period from 1990 through 1998, ranged from 0.94 to 0.66, decreasing as the effectiveness of hatchery fish spawning in the wild increased compared with that of fish of wild origin (McClure *et al.* 2000). In 2002, 15,286 steelhead were counted at Rock Island Dam, compared with the 2001 count of 28,602, and the 10-year average return of 9,165. Of the total steelhead counted at Rock Island Dam in 2002, 10,353 were wild steelhead (Fish Passage Center 2003).

<u>LCR Coho Salmon</u>
The status of Lower Columbia River coho salmon was initially reviewed by NOAA Fisheries in 1996 (NMFS 1996b) and the most recent review occur in 2001 (NMFS 2001a). In the 2001 review, the BRT was very concerned that the vast majority (over 90%) of the historical populations in the LCR coho salmon ESU appear to be either extirpated or nearly so. The two populations with any significant production (Sandy and Clackamas) were at appreciable risk because of low abundance, declining trends and failure to respond after a dramatic reduction in harvest. The large number of hatchery coho salmon in the ESU was also considered an important risk factor. The majority of the 2001 BRT votes were for ‘at risk of extinction’ with a substantial minority in ‘likely to become endangered.’

New analyses include the tentative designation of demographically independent populations, the recalculation of metrics reviewed by previous BRTs with additional years of data, estimates of median annual growth rate under different assumptions about the reproductive success of hatchery fish, a new stock assessment of Clackamas River coho by the ODFW (Zhou and Chilcote 2003), and estimates of current and historically available kilometers of stream.

As part of its effort to develop viability criteria for LCR salmon and steelhead, the Willamette/Lower Columbia Technical Recovery Team has identified historically demographically independent populations of ESA-listed salmon and steelhead in the Lower Columbia River (Myers *et al.* 2002). Population boundaries are based on an application of Viable Salmonid Populations definition (McElhany *et al.* 2000). Based on the Willamette Lower Columbia Technical Review Team’s framework for chinook and steelhead, the BRT tentatively designated populations of LCR coho salmon. A working group at the Northwest Fisheries Science Center hypothesized that the LCR coho salmon ESU historically consisted of 23 populations.

Previous BRT and ODFW analyses have treated the coho in the Clackamas River as a single population (see previous status review updates for more complete discussion and references). However, recent analysis by ODFW (Zhou and Chilcote 2003) supports the hypothesis that coho salmon in the Clackamas River consist of two populations, an early run and a late run. The late run population is believed to be descendant of the native Clackamas River population, and the early run is believed to descend from hatchery fish introduced from Columbia River populations outside the Clackamas River basin. The population structure of Clackamas River coho is uncertain, therefore, in the BRT (2003) report, analyses on Clackamas River coho are conducted under both the single population and two population hypotheses for comparison.

The paucity of naturally-produced spawners in this ESU can be contrasted with the very large number of hatchery-produced adults. Although the scale of the hatchery programs, and the great disparity in relative numbers of hatchery and wild fish, produce many genetic and ecological threats to the natural populations, collectively these hatchery populations contain a great deal of genetic resources that might be tapped to help promote restoration of more widespread naturally-spawning populations.

The status of this LCR coho salmon was reviewed by the BRT in 2000, so relatively little new information was available. A majority (68%) of the likelihood votes for LCR coho salmon fell in the 'danger of extinction' category, with the remainder falling in the 'likely to become endangered' category. As indicated by the risk matrix totals, the BRT had major concerns for this ESU in all VSP risk categories (risk estimates ranged from high risk for spatial structure/connectivity and growth rate/productivity to very high for diversity). The most serious overall concern was the scarcity of naturally-produced spawners throughout the ESU, with attendant risks associated with small population, loss of diversity, and fragmentation and isolation of the remaining naturally-produced fish. In the only two populations with significant natural production (Sandy and Clackamas), short- and long-term trends are negative, and productivity (as gauged by preharvest recruits) is down sharply from recent (1980s) levels.

Generalized Fish Use in the Lower Columbia River

Based on the life histories of listed salmon and steelhead, fish likely will be present in the action area throughout the proposed construction period. The action area serves primarily as rearing habitat, especially for juvenile Chinook and coho salmon in the Columbia River plume, and saltwater acclimation habitat for juvenile salmon and steelhead, and migration habitat for adult salmon and steelhead. In the lower Columbia River, juvenile and adult steelhead migrate year-round, with peak smolt out-migration occurring May through June, and peak adult emigration occurring January through June. Juvenile and adult sockeye salmon migrate April through August, with peak smolt out-migration occurring May through June, and peak adult emigration occurring June through July. Juvenile and adult Chinook salmon migrate year-round, with peak smolt out-migration occurring March through July, and peak adult emigration occurring March through October. Juvenile and adult chum salmon migrate October through May, with peak smolt out-migration occurring March through May, and peak adult emigration occurring October through November. Juvenile and adult coho salmon migrate April through November, with peak smolt out-migration occurring March through May, and peak adult emigration occurring September through October.

Critical Habitat

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. The action area is within NOAA Fisheries' designated critical habitat for SR sockeye salmon, SR spring/summer Chinook salmon, and SR steelhead. The essential features of designated critical habitat within the action area that support successful spawning, incubation, fry emergence, migration, holding, rearing, and smoltification for ESA-listed salmonid fishes include: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (primarily juvenile), (8) riparian vegetation, (9) space, and (10) safe passage conditions.

### 2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402.02 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations and when appropriate combines them with its Habitat Approach (NOAA Fisheries 1999): (1) Consider the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; and (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the effects of the environmental baseline, and any cumulative effects, and considering measures for survival and recovery specific to other life stages. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. If so, step 5 occurs. In step 5, NOAA Fisheries may identify reasonable and prudent alternatives for the action that avoid jeopardy, if any exist.

The fourth step above requires a two-part analysis. The first part focuses on the action area and defines the proposed action's effects in terms of the species' biological requirements in that area (*i.e.*, effects on essential habitat features). The second part focuses on the species itself. It describes the action's effects on individual fish–or populations, or both–and places these effects in the context of the ESU as a whole. Ultimately, the analysis seeks to answer the question of whether the proposed action is likely to jeopardize a listed species' continued existence.

### 2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The biological requirements of a listed species are population characteristics necessary for salmon and steelhead to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. These requirements are best defined as the attributes associated with viable salmonid populations. Viable salmonid populations are populations that have a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame. The attributes associated with viable salmonid populations include adequate abundance, productivity (population growth rate), population spatial scale, and genetic diversity (McElhany *et al.* 2000). These attributes are influenced by survival, behavior and experiences throughout the life cycle and by all action affecting the species, and are therefore distinguished from the more specific biological requirements associated with the action area. However, it is important that the action area effects be considered in the context of these species-level biological requirements when evaluating the potential for the species to survive and recover (*i.e.*, in the context of the full set of human activities and environmental conditions affecting the species). Biological requirements may also be described as characteristics of the habitat for actions that primarily affect survival through habitat pathways.

The current status of each species indicates that the species-level biological requirements are not being met for any of the ESUs considered in this consultation. This indicates that improvements in survival rates (assessed over the entire life cycle) will be needed to meet species-level biological requirements in the future. NOAA Fisheries will assess survival improvements necessary in the life stages influenced by the proposed action after considering the environmental baseline, which is specific to the area affected by the proposed action. For this consultation, the biological requirements are habitat characteristics that would function to support successful adult migration, juvenile rearing and migration, and smoltification (see Table 1 for references).

### 2.1.4 Environmental Baseline

The north and south jetties at the mouth of the Columbia River were constructed to create hydraulic controls to maintain a fixed channel at the interface of the Columbia River and the Pacific Ocean to permit navigation of commercial traffic. The north jetty is approximately 2.5 miles long and was constructed between 1915 and 1917. The south jetty is approximately 6.6 miles long. The first 4.5 miles were constructed between 1885 and 1895, and the remaining 2.1 miles was constructed between 1913 and 1914. Several repairs to both jetties have taken place between 1934 and 1982.

The morphology of the mouth of the Columbia River has changed dramatically over the past century. Since the construction of the jetties, the inlet has deepened and stabilized, the outer ebb delta has migrated northward and offshore several miles, and the adjacent shorelines to the north and south have significantly erodedn. These effects have resulted in the modification and loss of habitat for salmonid fishes in the lower Columbia River, and along portions of the Oregon and Washington coasts.

### 2.1.5 Analysis of Effects

#### 2.1.5.1 Effects of Proposed Action

Construction Activities
Fish may be killed, or more likely temporarily displaced, by in-water work activities such as rock placement, pile installation, fixed barge offloading platform removal, and culvert installation and removal. In-water and near-shore activities construction activities are likely to temporarily increase turbidity.

Road construction would occur above MHHW. Road construction, and subsequent decommissioning, are likely to temporarily increase turbidity. NOAA Fisheries expects effects on water quality from road construction and decommissioning to be discountable, although there is some uncertainty due to limited details provided.

Rock Placement
Fish may be killed, or more likely temporarily displaced, during placement of rock, especially rock placed at and below MHHW. Rock size for the jetties would range from class 10 tons to class 40 tons, and placement of rock my take up to 15 minutes per rock depending on class. Placement of rock of this size class carries a reasonable potential for misplacement or de-stabilization of degraded sections of the jetties leading to section failure. The potential for such a failure is most likely at repair sections designated as a high priority. In the event of such a failure, fish may be injured or killed by contact with moving boulders, depending on the scale of the failure, as well as the time of year. Peak abundance of listed juveniles and adults fish in the mouth of the Columbia River is generally March through June of a given year, although peak abundance of adult fall Chinook and adult steelhead generally occurs July through September. Failures during this time of year have the highest probability of injuring or killing listed fish, and are most likely to affect juvenile fish, as adult salmonids are unlikely to be found near the jetty's edge during their inland migration.

Temporary Culvert
The Corps provided no details of how, and under what conditions, the culvert in the intertidal wetland would be installed and removed, and whether fish passage would be provided once installed. In the absence of definitive information, NOAA Fisheries draws the biologically conservative conclusion that, unless the culvert is installed to permit fish passage under all tidal conditions, fish may be stranded above water level at low tide, and killed due to asphyxiation.

Pile Installation – Effects of Increases in Acoustic Energy
Pile driving can generate intense underwater sound pressure waves that can injure or kill fishes (Caltrans 2001; Longmuir and Lively 2001; Stotz and Colby 2001; J. Stadler, NOAA Fisheries, Washington Habitat Branch, pers. obs. 2002). Injuries associated directly with pile driving include rupture of the swimbladder and internal hemorrhaging (Caltrans 2001; Abbott and Bing-Sawyer 2002; Stadler, NOAA Fisheries, Washington Habitat Branch, pers. obs. 2002). Sound pressures 100 decibels (dB) above the threshold for hearing likely are sufficient to damage the

auditory system in many fishes. Feist *et al.* (1992) reported sound pressure increased up to 25 dB above ambient levels from pile driving, at a range of 1946 ft from the source at a depth of 5 ft. Analysis of the sound field at 1946 ft showed significant acoustic energy between 200 and 400 Hz, and sound levels that were at least 20 dB above ambient levels.

The type and intensity of the sounds produced during pile driving depend on a variety of factors, including, but not limited to, the type and size of the pile, the firmness of the substrate into which the pile is being driven, the depth of water and the type and size of pile-driving hammer. Sound pressures are positively correlated with the size of the pile, as more energy is required to drive larger piles. Hollow steel piles as small as 14 inches in diameter have been shown to produce sound pressures that can injure fish (Reyff 2003). Firmer substrates require more energy to drive piles, and produce more intense sound pressures. Sound attenuates more rapidly with distance from the source in shallow than in deep water (Rogers and Cox 1988). Driving wooden piles do not produce these impacts.

Driving hollow steel piles with impact hammers produce intense, sharp spikes of sound which can easily reach levels that injure fishes. Vibratory hammers, on the other hand, produce sounds of lower intensity, with a rapid repetition rate. Sound waves or particles produced by impact hammers and those produced by vibratory hammers evoke different responses in fishes. When exposed to sounds which are similar to those of a vibratory hammer, fishes consistently displayed an avoidance response (Enger *et al*. 1993, Dolat 1997, Knudsen *et al*. 1997, Sand *et al*. 2000), and did not habituate to the sound, even after repeated exposure (Dolat 1997, Knudsen *et al*. 1997). Fishes may respond to the first few strikes of an impact hammer with a startle response. After these initial strikes, the startle response wanes and the fishes may remain within the field of a potentially-harmful sound (Dolat 1997). The differential responses to these sounds are due to the differences in the duration and frequency of the sounds.

Fishes respond to particle acceleration at infrasound frequencies. The response to infrasound is limited to the nearfield in relation to the source (<1 wavelength), and the fish must be exposed to the sound for several seconds (Enger *et al*. 1993, Knudsen *et al*. 1994, Sand *et al*. 2000). Impact hammers, however, produce such short spikes of sound, with so little energy in the infrasound range, that fishes fail to respond to the particle motion (Carlson *et al*. 2001). Thus, impact hammers may be more harmful than vibratory hammers for two reasons: First, they produce more intense pressure waves, and second, the sounds produced do not elicit an avoidance response in fishes, which will expose them for longer periods to the harmful pressures.

Pile installation is likely to lead to effects on salmonid fishes similar to those described above, for a period of 5 to 10 hours per day during pile installation. Although the use of a vibratory hammer, where substrates permit, would minimize some of the adverse effects described above, substrate conditions may require the use of impact hammers, increasing the likelihood of adverse effects during use.

Fixed Barge Offloading Platforms

Effects from driving sheet pile are described above under *Pile Installation – Effects of Increases in Acoustic Energy*. Turbidity-related effects from sheet pile installation and removal are described below under *Water Quality – Turbidity*. Construction of The platforms would require excavation of approximately 7,500 cy of material. All excavation would occur within an enclosed area minimizing the potential for increased turbidity. Approximately 45,000 cy of rock would be placed with the platform perimeters to form a solid feature for offloading operations.

The Corps provided no information regarding decking materials to be used for the platforms. Use of chemically treated wood for decking is likely to leach toxic substances into the Columbia River adversely affecting salmonid fishes. In the absence of definitive information, NOAA Fisheries draws the biologically conservative conclusion that, unless untreated wood is used, treated wood will result in release of toxic materials into the water. The use of untreated wood for the decking would minimize impacts.

Migration of creosote and its components (*e.g.*, copper and PAHs) from treated wood in lotic environments may adversely affect juvenile salmonid fishes (NMFS 1998). Copper is the main metal of concern because it is the most acutely toxic. Copper also leaches the most readily, followed by arsenic and chromium (Warner and Solomon 1990). Creosote contains over 300 compounds, including a variety of PAHs. Some PAHs are very toxic and bioconcentrate (NMFS 1998). Potential effects of elevated water column and sediments concentrations of copper and PAHs to the subject species include, but are not limited to: (1) Reduced growth and survival of juvenile fish; (2) altered hematology; and (3) reproductive effects, including reduced egg production, and increased deformities in fry (Sorensen 1991, Eisler 1998).

The platforms and fill materials would be removed upon completion of jetty repairs, and the site would be restored to pre-project conditions.

Water Quality – Turbidity

Heavy equipment would be used to place rock without isolation measures to minimize turbidity. Therefore, in-water work is likely to increase turbidity. These increases in turbidity are likely to increase physiological stress, physical injury (*e.g.*, gill abrasion), and potentially harm or displace rearing juvenile salmon and steelhead during in-water and near-shore work.

Potential effects from project-related increases in turbidity on salmonid fishes include, but are not limited to: (1) Reduction in feeding rates and growth, (2) increased mortality, (3) physiological stress, (4) behavioral avoidance, (5) reduction in macroinvertebrate populations, and (6) temporary beneficial effects. Potential beneficial effects include a reduction in predation by piscivorous fish and birds, and enhanced cover for fish, leading to improved survival of juvenile fish.

Increases in turbidity can adversely affect filter-feeding macroinvertebrates and fish feeding. At concentrations of 53 to 92 ppm (24 hours) macroinvertebrate populations were reduced (Gammon 1970). Concentrations of 250 ppm (1 hour) caused a 95% reduction in feeding rates in juvenile coho salmon (Noggle 1978). Concentrations of 1200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg 1983). Turbidity, defined as a measurement of relative clarity due to an increase in dissolved (*e.g.*, tannic acid) or undissolved particles, at moderate levels, can reduce primary and secondary productivity, and at high levels, can interfere with feeding and injure or kill adult and juvenile fish (Spence *et al.* 1996, Bjornn and Reiser 1991).

Although jetty repair work is planned to occur year-round, in-water and near-shore work would occur for no more than 5 to 10 hours per day, and would be intermittent (*e.g.*, rock placement may take 15 minutes per rock depending on class). Therefore, any turbidity increases likely would be pulsed and would dissipate to background concentrations within 1 hour.

<u>Site Restoration</u>
The Corps proposes to restore all areas affected by haul road construction, except for the haul roads constructed on the jetty crests. The Corps provided no details of the site restoration plan, therefore its potential effectiveness cannot evaluated.

<u>Water Quality – Potential Spills</u>
Operation of excavation equipment requires the use of fuel, lubricants, coolants, *etc.*, which, if spilled into a waterbody, could injure or kill aquatic organisms. The proposed action did not include refueling plan, or a spill prevention, containment and control plan, therefore measures to minimize adverse effects cannot be evaluated. In the absence of definitive information, NOAA Fisheries draws the biologically conservative conclusion that fish may be injured or killed due to accidental spills.

#### 2.1.5.2 Effects on Critical Habitat

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. Essential features of designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage. Effects to critical habitat would be similar to the effects described above in section 2.1.5.1.

#### 2.1.5.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." NOAA Fisheries is not aware of any specific future non-Federal activities within the action area that would cause greater effects to listed species than presently occurs.

### 2.1.6 Conclusion

The fourth step in NOAA Fisheries' approach to determine jeopardy is to determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of the species' survival and recovery in the wild. After reviewing the best available scientific and commercial information available regarding the current status of SR steelhead, UCR steelhead, MCR steelhead, UWR steelhead, LCR steelhead, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, UCR spring-run Chinook salmon, UWR Chinook salmon, LCR Chinook salmon, CR chum salmon, SR sockeye salmon, and LCR coho salmon, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NOAA Fisheries concludes that the action, as proposed, is not likely to jeopardize the continued existence of the above-listed species, and is not likely to destroy or adversely modify designated critical habitat for SR fall-run Chinook salmon, SR spring/summer-run Chinook salmon, and SR sockeye salmon.

Our conclusion is based on the following considerations: (1) In-water construction (*i.e.*, pile installation and removal, culvert installation and removal, rock placement) and its potential effects (*i.e.*, harm or harassment of listed fish, temporary increases in turbidity) likely will occur year-round, but will occur for no more than 5 to 10 hours per day, and will cause short-term, pulse-type effects; and (2) rock will be placed only within the original design footprint of the jetties. Other effects on water quality (increased risk of discharge from accidental spills, and possible leaching of toxic materials from treated wood) will be limited to the construction period.

### 2.1.7 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). Reinitiation of consultation is required: (1) If the amount or extent of incidental take is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the BA and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

## 2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonid fishes by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

### 2.2.1 Amount or Extent of Take

The proposed action covered by this Opinion is reasonably certain to result in incidental take of listed species because it includes activities that will harm, injure, or kill individuals of the ESUs that are likely to be present in the action area while the actions are completed. However, information about the distribution and abundance of those individuals is not specific enough to quantify the amount of fish that are likely to be taken. In such circumstances, NOAA Fisheries concludes that the amount of incidental take is unquantifiable.

When the amount of incidental take is unquantifiable, NOAA Fisheries identifies an extent of incidental take. The extent of incidental take for this action includes four areas: (1) The 4,000-foot long reach of the north jetty (stations 40+00 to 80+00), (2) the 8,000-foot long reach of the south jetty (stations 220+00 to 300+00), (3) the temporary dolphin pile-supported barge offloading platforms, and (4) the two temporary (2 to 4 years) 200-hundred foot long fixed barge offloading platforms. Based on the analysis of effects, NOAA Fisheries expects the sound pressure waves to result in incidental take of some cohorts of rearing and migrating fish found in the in-river repair areas. The scientific literature indicates that most of the species using this area would be migrating salmon and steelhead, and most cohorts of the Columbia River basin ESUs spend little time in the area affected by the proposed action, although sub-yearling and yearling Chinook and coho salmon use the near-field frontal zone of the Columbia River plume for extended periods of time, therefore incidental take from pile driving (i.e., wood pilings, steel pilings, steel sheet piling) is likely to primarily affect cohorts of Chinook and coho salmon. The analysis of effects indicates that the acoustic effects from pile driving are unlikely to be at a frequency (Hz) or sound pressure (dB) likely to harm listed salmon and steelhead at a distance greater than 1946 feet during pile installation.

While some fishes are likely to avoid areas of long term, repeated disturbance, impact hammers do not elicit an avoidance response in fishes; therefore, fish may remain within the sound pressure wave field potentially exposing them to harmful sound wave pressure. Thus, NOAA Fisheries expects that a low density (<.01%) of juveniles within each sound wave pressure field will be incidental taken during pile installation. NOAA Fisheries based its take estimate on a formula used in NOAA Fisheries biological opinion for the Benicia-Martinez New Bridge Project to estimate take associated with pile driving. If the pressure waves extend beyond 1946 feet from specific locations where pile installation will occur, additional incidental take likely would occur beyond the extent exempted by this incidental take statement and the Corps would need to reinitiate consultation pursuant to 50 CFR 402.12.

Installation of the two temporary fixed offloading platforms and placement of rock for jetty repairs (especially rock placed below MHHW) will result in a temporary loss of near-shore estuarine habitat, and will alter existing near-shore oceanic and intertidal habitats along the jetties, respectively, temporarily displacing some juvenile salmon and steelhead.

The analysis of effects also summarizes an increase in short-term turbidity plumes associated with pile installation, culvert installation and removal, and rock placement. NOAA Fisheries expects localized turbidity plumes to result in some low level of incidental take of listed fishes, and likely would be in the form of behavior modification. The temporal extent of take is limited to the 2 to 4 years that the Corps has indicated are required to complete the project.

### 2.2.2 Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize take of the above species from implementation of the proposed action. The Corps shall ensure that:

1. Minimize incidental take from general construction by applying conditions to the proposed action that avoid or minimize adverse effects to water quality, riparian, and aquatic systems.

2. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from the proposed action.

### 2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (construction), the Corps shall ensure that:

    a. <u>Timing of in-water work</u>. Sheet pile installation for the fixed barge offloading platforms is completed during the period between July 1 and February 28, unless otherwise approved in writing by NOAA Fisheries.
    b. <u>Cessation of work</u>. Project operations will cease under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.
    c. <u>Pollution Control Plan</u>. A pollution control plan is prepared and carried out to prevent pollution related to construction operations. The plan must contain the elements listed below, meet requirements of all applicable laws and regulations, and be available for inspection on request by NOAA Fisheries.
        i. A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

ii. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

iii. A description of turbidity control measures.

d. Preconstruction activity. Before significant[2] alteration of the project area, the following actions must be completed:

i. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite:

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[3]).

(2) An oil-absorbing, floating boom whenever surface water is present.

ii. Temporary erosion controls. All temporary erosion controls must be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

e. Heavy Equipment. Use of heavy equipment is restricted as follows.

i. Vehicle staging. Vehicles must be fueled, operated, maintained, and stored as follows.

(1) Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 ft or more from any stream, wetland, and mean higher high water (MHHW).

(2) Axillary fuel tanks stored at staging areas must have containment measures in place at all times.

(3) All vehicles operated within 150 ft of any stream, waterbody, wetland, or MHHW must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by NOAA Fisheries.

(4) All equipment operated below MHHW must be cleaned before beginning operations below the bankfull elevation to remove all external oil and grease.

ii. Stationary power equipment. Any stationary power equipment (*e.g.*, generators, cranes) operated within 150 ft of any stream, waterbody, wetland, or MHHW must be diapered to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

f. In-water work.

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[2] "Significant" means an effect can be meaningfully measured, detected or evaluated.

[3] When available, certified weed-free straw or hay bales must be used to prevent introduction of noxious weeds.

i. <u>Culvert replacement</u>

(1) The culvert must be designed so that fish passage is maintained into and out of the intertidal wetland at mean lower low water, and have a diameter 1.5 times the width of the wetted channel at high tide.

(2) Culvert installation and removal will take place during a low tides of -1.0 ft or greater as predicted for the City of Astoria, Columbia River, Oregon, unless the intertidal channel is hydrologically disconnected from the intertidal wetland and the Pacific Ocean.

ii. <u>Fixed barge</u>

(1) Decking materials for the fixed barge offloading platforms will be constructed using non-toxic materials.

(2) All materials excavated from within the fixed barge offloading platforms will be disposed of in an authorized upland location.

(3) Fill materials within the fixed barge offloading platforms perimeters will be removed before removal of the steel sheet pilings.

(4) All material used to restore the near shore areas disturbed from the installation and removal of the fixed barge offloading platforms will be clean fill, and similar in composition to the surrounding substrate.

g. <u>Earthwork</u>. Earthwork (including excavation, dredging, filling and compacting) will be completed as quickly as possible.

i. <u>Site stabilization</u>. All disturbed areas must be stabilized, including obliteration of temporary roads, within 12 hours of any break in work unless construction will resume work within 7 days between June 1 and September 30, or within 2 days between October 1 and May 31.

ii. <u>Source of materials</u>. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained outside the riparian area.

h. <u>Site restoration</u>. All streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows.

i. <u>Revegetation</u>. Areas requiring revegetation must be replanted before the first April 15 following construction with native woody species, *e.g.*, Sitka spruce, black cottonwood, western red cedar, coast willow, and twinberry.

ii. <u>Pesticides</u>. No pesticide application is allowed, although mechanical or other methods may be used to control weeds and unwanted vegetation.

iii. <u>Fertilizer</u>. No surface application of fertilizer may occur within 50 ft of any stream channel.

i. <u>Pile Driving</u>.

i. If substrate conditions are appropriate, vibratory hammers will be used to drive piles. If substrate conditions are not appropriate, impact hammers may be used. Impact hammers will require the use of a bubble curtain.

ii. Drive each piling as follows to minimize the use of force and resulting sound pressure.
  (1) When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.
  (2) When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices will be used to reduce sound pressure levels by 20 dB.
  (3) Place a block of wood or other sound dampening material between the hammer and the piling being driven.
  (4) In waters 25 ft or less, measured at mean lower low water, surround the piling being driven with a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.
  (5) Other sound attenuation devices as approved in writing by NOAA Fisheries.

iii. <u>Piling removal</u>.
  (1) Dislodge and remove the piling using only a vibratory hammer.

2. To implement reasonable and prudent measure #2 (monitoring), the Corps shall:

a. <u>Implementation monitoring</u>. Submit a monitoring report to NOAA Fisheries within 120 days of project completion describing the Corps' success meeting these terms and conditions. The monitoring report will include the following information.

i. <u>Project identification</u>.
  (1) Project name.
  (2) Corps contact person.
  (3) Starting and ending dates for work completed.
  (4) Photo of habitat conditions at the project site, before, during, and after project completion.[4]
    (a) Include general views and close-ups showing details of the jetties, culvert, fixed barge, and general project area, including pre and post construction.
    (b) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

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[4] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

ii. Work cessation. Dates work cessation was required due to high flows, if any.

iii. Pollution and erosion control. A summary of pollution and erosion control inspections, including any erosion control failure, hazardous material spill, and correction effort.

iv. Site preparation. Total cleared area, riparian and upland.

v. Culvert. Water elevations during culvert installation and removal at the intertidal wetland.

vi. Site restoration.

(1) Finished grade slopes and elevations.

(2) Planting composition and density.

(3) Confirmation that 80% revegetation survival or 80% plant coverage (including both plantings and natural recruitment) have been achieved, invasive non-native vegetation is under control, and plantings are protected from wildlife damage and other harm.

vii. Pile installation.

To monitor the impacts of incidental take, pile installation shall be monitored using a hydrophone with a modified output gain control to record low frequencies during pile installation.

(1) Hydrophone recordings shall be taken at 1946 feet (approximate) from each pile during installation and at depths of 5 and 10 feet. Recordings shall be continuous throughout each pile installation.

(2) Ambient sound pressure levels shall be recorded prior to pile installation.

(3) A copy of all hydrophone recordings to include plotted results of sound pressure levels during pile installation, distances and depths of recordings, and ambient sound pressure levels.

b. Submit monitoring report to:

NOAA Fisheries
Oregon State Habitat Office
**Attn: 2004/00315**
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

c. NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

## 3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

### 3.1 Background

Pursuant to the MSA:

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). "Adverse effect" means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects on EFH.

### 3.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: Chinook (*O. tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). EEH also has been designated for groundfish species and coastal pelagic species. The estuarine EFH composite includes those waters, substrates and associated biological communities within bays and estuaries of the EEZ, from mean higher high water level (MHHW) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in 33 CFR 80.1 (Coast Guard lines of demarcation). Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1999), coastal pelagic species (PFMC 1999a), and Pacific salmon (PFMC 1999b). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes.

### 3.3 Proposed Action

The proposed action is detailed above in sections 1.2 of this document. For this consultation, NOAA Fisheries defines the action area as all aquatic and upland habitats, including the adjacent riparian zone, within 700 ft (measured from the jetty crest) from the north jetty from station 25+00 to station 105+00, and 700 ft (measured from the jetty crest) from the south jetty from station 55+00 to station 325+00, and includes the staging area and haul road near the north shore of Clatsop Spit, and an area extending 700 ft from the fixed barge offloading platform beside the north shore of Clatsop Spit.(Table 2).

### 3.4 Effects of Proposed Action

The proposed action will adversely affect water quality for coastal pelagic species, groundfish species, and Chinook and coho salmon due to increased concentrations of suspended sediment and turbidity, potential spills of toxic materials, and loss of habitat along the jetty base.

### 3.5 Conclusion

The proposed action may adversely affect the EFH for coastal pelagic species, groundfish species, and Chinook and coho salmon.

### 3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the applicant and the terms and conditions described in the incidental take statement that is attached to the ESA biological and conference opinion for this project are all applicable to salmon EFH, except those relating to work timing, and the disposition of any individual fish killed or injured during completion of the project. With those exceptions, NOAA Fisheries incorporates those conservation measures and terms and conditions here as EFH conservation recommendations.

### 3.7 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920G) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse effects of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

### 3.8 Supplemental Consultation

The Corps must reinitiate EFH consultation with NOAA Fisheries if the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

**Table 2.** Species with designated EFH in the estuarine EFH composite in the state of Oregon.

| **Groundfish Species** | |
|---|---|
| Leopard Shark (southern OR only) | *Triakis semifasciata* |
| Soupfin Shark | *Galeorhinus zyopterus* |
| Spiny Dogfish | *Squalus acanthias* |
| California Skate | *Raja inornata* |
| Spotted Ratfish | *Hydrolagus colliei* |
| Lingcod | *Ophiodon elongatus* |
| Cabezon | *Scorpaenichthys marmoratus* |
| Kelp Greenling | *Hexagrammos decagrammus* |
| Pacific Cod | *Gadus macrocephalus* |
| Pacific Whiting (Hake) | *Merluccius productus* |
| Black Rockfish | *Sebastes maliger* |
| Bocaccio | *Sebastes paucispinis* |
| Brown Rockfish | *Sebastes auriculatus* |
| Copper Rockfish | *Sebastes caurinus* |
| Quillback Rockfish | *Sebastes maliger* |
| English Sole | *Pleuronectes vetulus* |
| Pacific Sanddab | *Citharichthys sordidus* |
| Rex Sole | *Glyptocephalus zachirus* |
| Rock Sole | *Lepidopsetta bilineata* |
| Starry Flounder | *Platichthys stellatus* |
| | |
| **Coastal Pelagic Species** | |
| Pacific Sardine | *Sardinops sagax* |
| Pacific (Chub) Mackerel | *Scomber japonicus* |
| Northern Anchovy | *Engraulis mordax* |
| Jack Mackerel | *Trachurus symmetricus* |
| California Market Squid | *Loligo opalescens* |
| | |
| **Pacific Salmon Species** | |
| Chinook Salmon | *Oncorhyncus tshawytcha* |
| Coho Salmon | *Oncorhyncus kisutch* |

## 4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on the best scientific and commercial data available. This section identifies the data used in developing this Opinion.


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